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ABSTRACT

Longitudinal multilevel path models (7,997 students, 44 high schools, 4 years) evaluated the effects of school-average achievement and perceived school status on academic self-concept in Hong Kong, a collectivist culture with a highly achievement-segregated high school system. Consistent with a priori predictions based on the big-fish-little-pond effect (BFLPE), higher school-average achievements led to lower academic self-concepts (contrast effect), whereas higher perceived school status had a counter-balancing positive effect on self-concept (reflected glory, assimilation effect). The negative BFLPE was the net effect of counterbalancing influences, stronger negative contrast effects, and weaker positive assimilation effects, so that controlling perceived school status led to purer, and even more negative, contrast effects. Attending a school where school-average achievement is high simultaneously results in a more demanding basis of comparison for one's own accomplishments (the stronger negative contrast effect) and a source of pride (the weaker positive assimilation effect). (Contains 57 references.) (Author/SM)

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Running Head: Contrast & Reflected Glory Effects

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Longitudinal Multilevel Models of the Big Fish Little Pond Effect on Academic Self-concept: Counterbalancing Contrast and Reflected Glory Effects in Hong Kong Schools

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This longitudinal study is part of an ongoing educational policy research project that was initiated by the Educational Research Section of the Hong Kong Education Department. The achievement data have been graciously provided to the authors for purposes of the present investigation, in part during visits by the first author to the Faculty of Education at The Chinese University of Hong Kong that were partially funded by the Chinese University of Hong Kong. The research was also supported through a Special Investigator Grant to the first author from the Australian Research Council. We thank Alexander Yeung, Ray Debus, Olaf Koeller, John Hattie, Rhonda Craven and Kate Johnson for helpful comments on earlier versions of this paper. Correspondence in relation to this study should be sent to Professor Herbert W. Marsh, Faculty of Education, University of Western Sydney, Macarthur, PO Box 555, Campbelltown, NSW 2560 Australia

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Abstract

Longitudinal multilevel path models (7,997 students, 44 high schools, 4 years) evaluated effects of school-average achievement and perceived school status on academic self-concept in Hong Kong, a collectivist culture with a highly achievement-segregated high school system. Consistent with a priori predictions based on the big-fish-little-pond effect (BFLPE), higher school-average achievements led to lower academic self-concepts (contrast effect) whereas higher perceived school status had a counter-balancing positive effect on self-concept (reflected glory, assimilation effect). The negative BFLPE is the net effect of counterbalancing influences, stronger negative contrast effects and weaker positive assimilation effects, so that controlling perceived school status led to purer – and even more negative – contrast effects. Attending a school where school-average achievement is high simultaneously results in a more demanding basis of comparison for one's own accomplishments (the stronger negative contrast effect) and a source of pride (the weaker positive assimilation effect).

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Social comparison processes lead students attending academically selective schools to experience lower academic self-concepts than equally able students attending less academically selective schools, a negative big-fish-little-pond effect (BFLPE). In the typical demonstration of this effect (see Marsh, 1993), school-average achievement is negatively related to academic self-concept after controlling the effects of individual student achievement. (Because the BFLPE is typically negative, it should, perhaps, be called the "little fish in a big pond" effect, but we retain the traditional BFLPE label.) According to this theoretical position, equally able students who attend schools in which school-average achievement differs will use correspondingly different frames of reference in evaluating their own academic accomplishments, and this process will affect academic self-concept and subsequent academic outcomes.

The historical, theoretical underpinnings of this research (see Marsh, 1984, 1991, 1993; Marsh & Parker, 1984) derive from research in psychophysical judgment (e.g., Helson, 1964; Marsh, 1974; Parducci, 1995), social judgment (e.g., Morse, & Gergen, 1970; Sherif & Sherif, 1969; Upshaw, 1969), sociology (Alwin & Otto, 1977; Hyman, 1942; Meyer, 1970), social comparison theory (e.g., Festinger, 1954; Suls, 1977), and the theory of relative deprivation (Davis, 1966; Stouffer, Suchman, DeVinney, Star & Williams, 1949). Coming from a psychometric tradition, the term contrast is used when the judgement of a target stimulus shifts away from the background or context, whereas the term assimilation is used when the judgement shifts toward the context (Marsh, 1974). In the BFLPE, contrast occurs when higher school-average achievement levels (the context) lead to lower individual student academic self-concepts (target judgment), whereas assimilation occurs when higher school-average achievement leads to higher academic self-concepts (Marsh, 1984). These terms are purely descriptive, but more "meaningful" terms are sometimes used; reflected glory, labeling, and identification for assimilation; negative social comparison or negative BFLPE for contrast. This proliferation of terms creates some ambiguity in that social comparison processes can result in either contrast or

assimilation, but social comparison effects are sometimes used to mean contrast effects. For purposes of this study, we treat BFLPE and social comparison processes as generic processes that can result in either (or both) contrast (negative social comparison) effects or assimilation (positive social comparison, reflected glory) effects.

Whereas previous BFLPE research has focused on negative contrast effects, the BFLPE is hypothesized to be the net effect of two counterbalancing processes – negative contrast effects that have been emphasized and positive, reflected-glory, assimilation effects. Because the BFLPE is consistently negative, the negative contrast effect is apparently much stronger than the positive assimilation effect. Although reflected-glory assimilation effects have a clear theoretical basis, these effects have been implicit and have not been adequately operationalized in BFLPE studies. Hence, a major focus of the present investigation is to simultaneously identify both the contrast and reflected glory assimilation effects posited to underlie the BFLPE.

Big Fish Little Pond Effect

In support of the clearly established multidimensionality of self-concept and the need to distinguish between academic and non-academic components of self-concept (Byrne, 1996; Marsh, 1993), the BFLPE is very specific to academic self-concept. Marsh (1993) showed that there were large negative BFLPEs for academic self-concept, but little or no systematic effects on nonacademic components of self-concept, general self-concept, or self-esteem. In two studies of the effects of participation in gifted and talented programs (Marsh, Chessor, Craven, & Roche, 1995), Math, Verbal and Academic self-concepts in the gifted and talented programs declined over time and in relation to the comparison group, but effects on four nonacademic self-concepts and for self-esteem were small and largely nonsignificant. Marsh (1987) also argued that the size of the negative contrast effects should vary with the size of the contextual differences being considered. Big differences in school-average ability should result in large contrast effects, whereas there should be no contrast effects if all schools had the same school-average ability.

Hence, whereas Marsh and Parker (1984) reported a contrast effect of -.36 based on schools specifically chosen to be extreme in terms a school-average ability, more modest contrast effects of -.23 (Marsh, 1987) and -.21 (Marsh, 1991) were found in nationally representative samples.

Broader Implications

In a very large, nationally representative sample of US students, Marsh (1991) greatly expanded the range of outcome variables to include: academic and general self-concept, coursework selection, academic effort, educational and occupational aspirations, school grades, standardized test scores collected in the sophomore year and again in the senior years of high school; and college attendance and aspirations measured two years after high school graduation. The effects of attending higher-ability high schools were negative for almost all 23 outcomes and were not significantly positive for any outcome. Whereas some effects were small (e.g., standardized test scores), none were positive for this set of outcomes including many of the most frequently cited goals of education. Furthermore, there were additional negative effects during the last two years of high school beyond the already negative effects earlier in high school. In addition to academic self-concept, school average achievement had a substantial negative effect on educational and occupational aspirations – even two years after graduation from high school. When asked how far in school they were likely to go on an externally anchored, "absolute" scale (e.g., university, masters degree), students attending schools with a high school-average ability had lower aspirations than equally able students attending academically less selective schools, and these negative effects were still evident two years after high school graduation. Finally, substantial proportions of the negative effects of school-average ability on the entire set of academic outcomes were mediated by the negative BFLPE on academic self-concept.

The Juxtaposition of BFLPE Contrast and Assimilation (Reflected Glory) Effects

If students compare their own accomplishments with those of classmates in academically selective schools, then their academic self-concept should decline; a negative BFLPE or contrast

effect (e.g., there are a lot of students better than I am so I must not be as good as I thought). Alternatively, affect, identification, self-perceptions, and self-concept may be enhanced by membership in groups that are positively valued through the reflected glory of accomplishments or good qualities of other group members that should result in a positive BFLPE. There is ample evidence that people enjoy basking in the reflected glory of successful others by merely associating with distinguished individuals or joining highly valued social groups (e.g., Cialdini & Richardson, 1980; Snyder, Lassegard, & Ford, 1986; Tesser, 1988). Based partly on this theoretical perspective, Marsh (1984, 1993; also see Felson, 1984; Felson & Reed, 1986; Firebaugh, 1980) argued that students in academically selective schools might have more positive academic self-concepts by virtue of being chosen to be in a highly selective educational program -- an assimilation, reflected glory, identification, or labeling effect (e.g., if I am good enough to be in this selective school with all these other very smart students, than I must be very smart). A reflected glory effect would be particularly likely if the selection was highly valued and if the selection process was highly visible with important implications.

Reflected glory processes provide considerable scope for impression management in which individuals emphasize their association with successful groups and distance themselves from unsuccessful ones (e.g., Cialdini & Richardson, 1980; Snyder, Lassegard, Ford, 1986). In related research, Tesser's (1988) self-evaluation model predicts that in the face of negative social comparisons individuals will discount the importance they place on the particular dimension. For example, Gibbons, Benbow, and Gerrard (1994) reported that gifted students in selective academic settings discounted the importance of academic achievement when their own performances were lower than those of other children. Social comparison research shows that people cope with stress (Buunk & Ybema, 1997) by choosing downward comparison targets that make them feel relatively better and protects their self-esteem (Lazarus & Folkman, 1984; Wills, 1981) or by choosing upward comparison targets for purposes of identification, aspirations,

affiliation, and obtaining useful information or coping strategies (e.g., Buunk & Ybema, 1997; Taylor & Lobel, 1889). Thus, individuals prefer upward comparisons that facilitate identification and being like the comparison targets, but not when forced to contrast their own poorer attributes with the better attributes of upward comparison targets. Downward comparisons are preferable when they facilitate contrast of ones own attributes with those of others who have poorer attributes, but not when the comparison leads to identification with or perceiving oneself (or being perceived by others) as being similar to the downward comparison target.

Although such coping and impression management strategies are relevant, our focus is more on social comparison processes associated with how well-established group membership (the school one attends) affects self-concept. Diener and Fujita (1997) refer to this as situationally imposed or forced comparisons as opposed to a more flexible situation in which individuals have considerable freedom to consciously select or construct a comparison target so as to maximize various goals. They suggested that there is limited support for social comparison theory in this forced comparison setting, but emphasized that school closely approximate a "total environment" (where the frame of reference affecting judgement is limited to the immediate context) implicit in the forced comparison and cited this BFLPE research as one of the few well-validated examples showing that imposed comparisons do have a substantial, lasting impact. The school is a total environment in that there are so many inherent constraints and a natural emphasis on social comparison of achievement levels of classmates in a school setting. Similarly, educational psychologists (e.g., Covington, 1992; Marsh, 1993; Marshall & Weinstein, 1984; also see Goethals & Darley, 1987) emphasize the extreme salience of achievement as a reference point within a school setting, particularly when the outcome measure is academic self-concept.

Both the counter-balancing negative contrast effects and positive assimilation effects are likely to affect self-concept so that the typically observed BFLPE is actually a net effect (Marsh, 1984, 1993). This implies that an assimilation effect may be operating even though it is

overshadowed by contrast effects. Furthermore, controlling for the positive assimilation effects by including relevant variables in the model should result in purer, more negative contrast effects. Felson and Reed (1986) made a related distinction, emphasizing that these effects should be considered simultaneously because they are likely to suppress each other, but lamented that survey studies have not included such controls.

McFarland and Buehler (1995) specifically looked at the juxtaposition of the negative BFLPE and the positive reflected glory effects as a paradox, noting that there was surprisingly little work relating individuals' self-appraisals and perceptions of their groups. In a series of laboratory studies using feedback manipulations about individual and group performance, they found that people who feel more strongly about their group membership experience more positive affect when their group does well and more negative affect when their group does poorly. Following from cross-cultural research distinguishing between collectivist and individualist cultures (e.g., Markus & Kitayama, 1991; Triandis, 1989; also see Hofstede, 1991) that differ in the way they value social groups, McFarland and Buehler classified multicultural North American university students as coming from collectivist or individualist societies. In defending this approach, they noted research showing that even second-generation American teenagers of Hong Kong descent responded more like their collectivist Hong Kong counterparts than other American teenagers. McFarland and Buehler found that students from collectivist countries experienced significantly smaller negative BFLPEs than students from individualistic countries. They also noted an asymmetry such that individuals who value group membership can focus on their individual performances when they do well or on the performance of their group when they do poorly, thus allowing them to protect their self-concept. Based on their findings, they proposed a revision to the BFLPE metaphor: "although everyone feels good about being a big fish in a little pond, not everyone feels bad about being a little fish in a big pond" (p. 1068).

Marsh, Koller and Baumert (1998) juxtaposed assimilation and contrast effects in a large, natural quasi-experimental study; the reunification of the East and West German school systems following the fall of the Berlin wall. Prior to the reunification, East Germany had a strong policy against ability grouping at either the school or individual classroom level. In West Germany, students generally entered one of the three types of secondary schools at the end of four years of primary schooling. The elite Gymnasium (highest track school) students received a more academic curriculum, attended school for more years, and were expected to go to university. In the reunified system, the prior East German school system was largely transformed into the existing West German system. At time 1, the start of the first school year after the reunification, the East German students had not previously experienced selective schools whereas the West German students had attended achievement-segregated schools for the previous two years. Consistent with this difference, the BFLPE was initially much more negative for former West German students compared to East German students, but the difference was smaller by the middle of the year and had disappeared by the end of the first school year after the reunification. There was also, however, some weak evidence of a positive reflected glory assimilation effect of attending a Gymnasium in addition to the negative contrast effect. The authors cautiously interpreted the results as supportive of theoretical predictions about the counter-balancing effects of the contrast and reflected glory, assimilation effects, but emphasized that because they had not operationalized and directly measured reflected glory, there was need for further research based on more direct measures of reflected glory that is a focus of the present investigation.

Our Investigation: The Juxtaposition of BFLPE and Reflected Glory Effects in Hong Kong

In our four year longitudinal study we evaluate the BFLPE and the juxtaposition between assimilation and contrast effects for a large cohort of high schools in Hong Kong, one of the most highly achievement segregated high school systems in the world (Lo, et al., 1997; Tsang, 1998). As emphasized by Bond (1996) and others (e.g., Chinese Culture Connection, 1987; Diener,

Diener, & Diener, 1995; Hofstede, 1991) Hong Kong is low on the cultural value of individualism and high on collectivism. Hence, this setting is particularly interesting for studying the BFLPE because people in a highly collective culture should be less susceptible to the negative contrast effects due to social comparison processes and should have a greater tendency to value their social group than those in individualistic settings (e.g., McFarland & Buehler, 1995; also see Markus & Kitayama, 1991; Triandis, 1989). Consistent with this perspective, face -- one's reputation -- is of great concern in the Chinese culture (e.g., Ho, 1976) and admission to a prestigious high school is highly valued in Hong Kong. Hence, the gain in status and face for oneself and one's family due to attending a prestigious high school (reflected glory, assimilation) may possibly overshadow the loss in academic self-concept due to negative contrast resulting from comparisons with high achieving classmates. Also consistent with this potential deemphasis of social comparison processes, Hau and Salili (1991, 1996) found that Hong Kong students attribute their examination results more to effort than to ability and that they concentrate more on their own improvement over time than on comparison with other students as determinants of perceived academic achievement. If Chinese students do value strongly being members of a high average achievement school (stronger assimilation effects) and their collective orientation reduces attention to social comparison processes (weaker contrast effects), the net BFLPE may be substantially less negative or even be close to zero (see McFarland & Buehler, 1995).

Our investigation also incorporates several advantages over most previous BFLPE research in that it: specifically includes a new measure of perceived school status to infer reflected glory; uses particularly good measures of pretest achievement collected prior to the start of high school that are not confounded with true school effects; and employs multilevel modeling that more appropriately disentangles effects due to individual students and schools than inappropriate multiple regression analyses used in most previous research.

In summary, Hong Kong is an ideal setting in which to test the generalizability of the BFLPE that is based primarily on Western research and the new emphasis on the juxtaposition between assimilation and contrast effects. Hong Kong is one of the most highly achievement segregated high school systems in the world which might strengthen the negative contrast effects, but cultural differences should undermine the negative contrast effects and reinforce the positive reflected glory assimilation effects. These differences -- along with the methodological advances incorporated into this study – have important theoretical and practical implications for BFLPE studies and their integration with the larger body of social comparison research.

Method

Sample

In Hong Kong, schooling through Grade 9 is compulsory and free. At the end of Grade 6, secondary school places for Grade 7 are allocated according to parental choice in the order of merit of students' internal school examination results moderated by public examination performance. Students are largely free to choose any high school in Hong Kong, schools select students largely on the basis of merit, and schools attracting better students are those with better examination results, higher university admission rates , a history of positive results, and a good reputation among parents as well as other desirable characteristics (e.g., proximity to home). Admission into the most prestigious high schools is highly valued and, because this selection mechanism is based primarily on academic merit, the Hong Kong secondary school system is one of the highly achievement-segregated in the world (Lo et al., 1997; Tsang, 1998). Thus, for example, using the segregation index based on the ratio of variation within schools to total variation in achievement scores, Tsang (1998) showed that Hong Kong secondary schools were somewhat more achievement segregated than Singapore schools and substantially more segregated than US and Canadian schools.

Our study was part of a large-scale investigation on different types of secondary schools in Hong Kong. The sample is broadly representative of Hong Kong schools, including a diversity of schools

broadly representative of Hong Kong secondary schools in terms of religious background, mode of government subsidy, and gender grouping, but with a somewhat greater emphasis on less-able students. The original sample consisted of 10,366 Chinese secondary students in Grade 7 attending one of fifty high schools (approximately 15% of the year cohort for the entire country).

The placement test scores completed in Grade 6 were used to infer pretest achievement at the individual student level (T0Ach) and to constuct the school-average measure of achievement at the school level (S_Ach). In each of the following three years (T1, T2, T3), achievement tests were administered by the Department of Education and during the last two years (T2, T3) survey materials were collected by each school. At T3, however, several schools could not collect survey data due to the cancellation of school because of bad weather and they were unable to reschedule the collection due to extremely tight schedules near the end of the school year. Because our major focus was academic self-concept and some of the statistical procedures we considered precluded the inclusion of variables for which all cases are missing within a given school, we considered only those 44 schools that collected self-concept data in both Grades 8 and 9. Similarly, because T2 was the first administration of the survey materials, individual students were only included in the final sample if they were enrolled in the school at T2 (the first year that the survey material was administered) as determined by the completion of at least one of the achievement tests or the survey materials. Excluded students were primarily those who were absent for both achievement testing sessions and the separate testing occasion when the survey material was administered, who changed schools, or who could not be matched on basis of the official Hong Kong Identity Card number. The final sample (7,997 students from 44 high schools) was representative of the original sample in terms of academic achievement in that there were no significant differences between included and excluded students for T0Ach, the pretest placement score that was available for all students.

Procedures and Measures

Measures were pretest (T0Ach) achievement, standardized achievement tests administered at T1, T2, and T3 (T1Ach, T2Ach, T3Ach), academic self-concept collected at T2 and T3 (T2ASC, T3ASC), and a measure of perceived school status. At the end of Grade 6 (T0), students are allocated a moderated placement score that represents an internal aggregate of achievement in all school subjects except physical education (although Chinese, English and mathematics are weighted more heavily) that is moderated by external examinations. Because these scores are the primary basis for the extremely important selection into high schools, they are very important to students and schools and the results provide an excellent pretest measure of achievement (T0Ach).

At T1, T2, and T3, students completed achievement tests according to a modified random matrix sampling design. Each student was randomly assigned an achievement test in one of three core subjects (Chinese, English, and mathematics) in the first testing session and one of three additional subjects (geography, history, and science) in the second session. This randomization procedure worked well for the three core subjects (based on comparisons of groups on the T0Ach, the pretest achievement placement score common to all students), but was less successful for the second set of tests in that some schools did not offer both history and geography so that only the remaining two achievement tests were used in the second test session. This resulted in a somewhat higher proportion of science tests in that science was offered by all schools and the group of students taking the science test had somewhat lower T0Ach scores than did those taking the history or geography tests. In order to compensate for this sample bias, scores for each of these three subjects were scaled in relation to scores on the T0Ach so that scores for all 6 tests were directly comparable. For purposes of this study, a total achievement test was obtained for each student in each year of the study by taking the mean of the tests completed by each student in each of the three years (T1Ach, T2Ach, and T3Ach) of the study.

The survey instrument administered at T2 and T3 (in Grades 8 and 9) included a Chinese translation of the SDQ-II (Marsh, 1990), but for purposes of our investigation, only responses to the

academic self-concept scale from the SDQ-II are considered. The survey materials also contained a four-item School Status scale ("My school has a good reputation", "The academic standard of my school is high, many students want to get in", "It is well known that my school gets good results in public examinations", and "The academic standard of my school is high, our graduates are very popular"). For present purposes, a single measure of school status for each individual student (the mean of nonmissing responses at T2 and T3) is considered. Responses to all the self-concept and school status items were on a 6-point scale ranging from 1 (false) to 6 (true) and administration procedures were based upon those recommended in the SDQ-II test manual (Marsh, 1990).

Statistical Analysis

A detailed presentation of the conduct of multilevel modeling (also referred to as hierarchical linear modeling) is available elsewhere (e.g., Bryk & Raudenbush, 1992; Goldstein, 1995). Particularly in social, organizational, and educational research, characteristics associated with individuals who are clustered within groups (e.g., students in schools, residents in neighborhoods, employees in companies) pose special problems related to appropriate levels of analysis, aggregation bias, heterogeneity of regression, and associated problems of model misspecification due to lack of independence between measurements at different levels. It is generally inappropriate to pool responses of individuals without regard to groups and relations observed at one level may not bear any straightforward connection to relations observed at another level (e.g., the positive effects of individual achievement and the negative effects of school-average achievement on academic self-concept being a particularly dramatic example). A more detailed summary of the multilevel analyses conducted here is presented in Appendix 1.

Results

Preliminary Analyses

Prior to presentation of the multilevel analyses, it may be useful to examine some preliminary results to explicate the BFLPE. Academic self-concept is positively correlated with achievement;

pretest achievement (from Grade 6, prior to the start of high school) is positively correlated with academic self-concept at Grade 8 (.23) and Grade 9 (.25), whereas Grade 9 achievement is correlated more highly with Grade 9 academic self-concept (.37). Students who attend schools with higher school-average pretest achievement have slightly higher academic self-concepts than do students who attend schools with lower school-average achievement; school-average pretest achievement is positively correlated with academic self-concept in Grade 8 (.12) and Grade 9 (.13). These small differences, however, are substantially smaller than would be expected based on differences in pretest achievement levels of students in these schools. For example, when both individual and school-average achievement are regressed on academic self-concept, the effect of individual achievement is much higher (β = .34 for Grade 8, .39 for Grade 9) whereas the effect of school-average achievement is negative (β = -.20 for Grade 8, -.22 for Grade 9). Although comparisons of beta-weights from different studies should be made cautiously, the sizes of these negative effects are comparable to those found in nationally representative samples of US students (e.g., -.21, Marsh, 1987; -.23, Marsh, 1991). Alternatively, this same phenomena is illustrated by dividing individual and school-average pretest achievement into three (high, medium, and low) levels and considering the actual and predicted (based on pretest achievement) self-concepts for each of the 3 x 3 cells (see Table 1). At each level of individual achievement, self-concept is systematically higher at schools with the lowest school-average achievements and systematically lower at schools with the highest school-average achievements. Similarly, whereas that mean academic self-concept in the schools with the highest school-average achievements are above average (.16 SD), they are not nearly as high as the predicted self-concept (.95 SD) based on the substantially higher pretest achievement levels at these schools. These preliminary results illustrate the BFLPE in that students attending schools with higher school-average achievements have systematically lower academic self-concept – lower than predicted on the basis of their high levels of pretest achievement and lower than students with similar abilities in schools with lower

school-average achievements. Although illustrative, the inappropriateness of dividing a continuous variable into discrete categories and of analyzing multilevel data as if there were only a single level is well known. Hence, we now turn to the more appropriate multilevel analyses.

Insert Tables 1 & 2 and Figure 1 about Here

Negative Effects of School-average Ability Effects on Academic Self-concept

The negative contrast effect is reflected in the negative effect of school average pretest achievement (S_Ach) on academic self-concept after controlling at least individual pretest achievement (T0Ach). In the first set of models (Models 1 – 3, see Table 2 & Figure 1), the negative effect of school-average achievement on T2 academic self-concept varies from -.22 (when only T0Ach is controlled) to -.24 (when T0Ach, T1Ach, and T2Ach are controlled). Not surprisingly, academic self-concept is significantly related (positively) to each of the achievement scores. The pattern of results is similar for models 4-6 based on T3 academic self-concept.

Because academic self-concept was measured on two occasions, it is possible to evaluate the additional negative effects of school-average achievement at T3 beyond the negative effects at T2 (Models 7 – 9, Table 2). These are models of self-concept change because the effects of T2 self-concept are partialled out of T3 self-concept. Not surprisingly, the largest effect on T3 self-concept in each of these models is T2 academic self-concept, although academic achievement continues to have a significant effect. Of critical importance, the negative effect of school-average achievement on T3 academic self-concept is still significantly negative even after controlling the negative effect of school-average achievement mediate by T2 self-concept. Hence, there are new, additional negative effects of school average achievement on T3 academics self-concept beyond the negative effects at T2.

Although not so central to the present investigation, it is of interest to determine whether the size of the BFLPE varies with the pretest achievement level of individual students. In Models 1 - 9 these interaction effects (T0Ach x S_Ach, Table 2) are consistently small, the directions of the

effects vary from model to model, and the interpretation of these small effects is complicated. In Model 3 the effect of school-average achievement on the T0Ach slope is positive (.05); the effect of individual achievement is more positive when school-average achievement is high. However, for the remainder of the models in Table 2, this effect is either significantly negative or nonsignificant, but the effect of school-average achievement on the slope for final measure of achievement is positive. In model 7, for example, school-average achievement has a significantly positive effect on the effect on the slope of T2 achievement, but has a significantly negative effect on the slope for T0 achievement. Hence, although there is some suggestion that the negative BFLPE is less negative for the highest achieving students, these effects are weak and interpretations should be made cautiously.

In summary, Models 1- 9 provide clear support for the negative BFLPE in Hong Kong high schools. Not only are there negative BFLPEs for T2 and T3 academic self-concept considered separately, but the negative BFLPEs for T3 academic self-concept are larger than those that can be explained by the negative BFLPE already experienced at T2.

School-average Ability Effects on Academic Achievement

In Models 10 - 15 (Table 3), T1, T2 and T3 achievement scores are related to pretest achievement (T0Ach) and school-average pretest achievement (S_Ach). Not surprisingly, the largest effects are those of prior achievement. None of the effects of school-average achievement on subsequent achievement is significant. Interactions between school-average achievement and individual achievement (e.g., T0Ach x S_Ach) are also small, but the one significant effect (Model 10) is negative; the positive effect of pretest achievement on T1 achievement is somewhat weaker in schools with a high school-average achievement. Because almost all of the effects of school-average achievement are nonsignificant, it appears that growth in achievement is not much affected by school-average achievement.

Insert Tables 3 and 4 about Here

Positive Effects of Academic Self-concept Effects on Subsequent Academic Achievement

In Models 16-21 (Table 4), academic self-concept is added to models predicting T2 and T3 achievement. There are two particularly noteworthy features of these models. First, the effects of self-concept on achievement are positive even after controlling for measures of prior achievement. Although not the focus of the present investigation, these results contribute to the growing body of research (e.g., Byrne, 1996; Marsh, 1993; Marsh & Craven, 1997) based on longitudinal path models, showing that self-concept has a "causal" effect on achievement (although models in Table 2 also indicate that prior achievement affects subsequent self-concept, indicating that the relations are reciprocal). The other important feature of these Models is the positive effect of school-average achievement on subsequent achievement, although the effect is only marginally significant ($.05 > p > .01$) for three of the models (Models 17 – 19, Table 4). It is, however, useful to compare these models with the corresponding Models 13-15 (Table 3) that did not include self-concept as predictor variables for which the corresponding effects of school-average achievement were nonsignificant. Hence, these school-average achievement effects are predicated on controlling for self-concept. Academic achievements of students in schools with higher school average achievements do not differ significantly from what is predicted on the basis of prior achievement by these students, but these students do achieve slightly better than might be expected from their depressed levels of academic self-concept.

In summary, the results further support the positive effects of prior academic self-concept on subsequent achievement, even after controlling the effects of prior academic achievement.

Perceived School Status

In models 22-27 (Table 5), perceived school status is modeled as a function of prior achievement, academic self-concept, and school-average achievement. For all the models, there is a very large, positive effect of school-average achievement (.56 to .60) and a consistently positive effect of academic self-concept. Students who have higher academic self-concepts

perceive the status of their school to be higher (although models in the next section show that status has a positive effect on subsequent academic self-concept, so that the effect is reciprocal).

Insert Table 5 about Here

Interestingly, individual student achievement has a negative effect on perceived school status; better students perceive the status of their school to be lower than do poorer students, and the negative effect of student achievement on school status is more negative when school-average achievement is low. This pattern of results is logical and consistent with our interpretation of reflected glory effects. Very high performing students perform better than most of the other students in their school – particularly if school-average achievement is low – so they do not experience as much "reflected glory" as do students not doing as well who can look up to the best students. Given that lower-achieving students perceive the status of their school to be higher, there may be some dissonance reduction (e.g., I may not be doing so well, but at least I am in a good school). This pattern is consistent with upward and downward comparison strategies posited in other social comparison research (e.g., Buunk & Ybema, 1997; Diener & Fujita, 1997; also see Crocker & Luhtanen, 1990) in which upward comparisons are more likely when the comparison targets are perceived as being of a higher status. Consistent with Buunk and Ybema's identification-contrast model, when students perceive themselves as being more able than their classmates there is little benefit in identifying with them. A more effective strategy, at least in terms of maximizing academic self-concept, is to contrast their relatively superior skills with those weaker skills of their classmates. However, when students perceive their academic skills to be weaker than those of their classmates, then it is a more effective strategy to identify with the high perceived status of the school rather than to contrast their poorer skills with the superior skills of their classmates. Hence, even in this study of highly imposed social comparisons, there is support for Diener and Fujita's speculation "that imposed social comparisons and comparisons selected by the individual might work together" (p. 353).

Juxtaposition of Social Comparison Contrast and Reflected Glory Assimilation Effects

The effects of students' perceived status of their school are added to models of T3 academic self-concept (Models 28-31, Table 6). The critical features of these models is the juxtaposition of the effects of school-average pretest achievement (S_Ach) and perceived status and the comparison of the effects of school-average achievement with those in corresponding models already considered (in Tables 2and 4) that do not include school status.

Insert Table 6 about Here

The effect of perceived school status on T3 academic self-concept is positive (.17 in both Models 28 and 29, Table 6; also see Fig 1) and continues to be positive even after controlling for T2 self-concept. In marked contrast, the effects of school-average achievement on T3 academic self-concept are substantially negative (-.33 and -.31). These negative effects of school-average achievement are substantially more negative than in corresponding models that did not include school status. Thus, for example, Model 5 (Table 2) and Model 28 (Table 6) differ only in the inclusion of school status, but the negative effect of school-average achievement is -.33 in Model 28 that included school status but is only -.23 in Model 4 that excludes school status. Similarly, the negative effect of school-average achievement is -.31 in Model 29 that included school status but is only -.21 in Model 5 that excludes school status. The negative effect of school-average ability is more negative when school status is controlled.

In Models 30 and 31, T2 academic self-concept is added to models predicting T3 academic self-concept so that these are models of self-concept change. Controlling the effects of prior self-concept reduced the effects of school status and of school-average achievement. Even after controlling for these effects that were mediated through T2 self-concept, however, there are new, additional negative effects of school-average achievement and new, additional positive effects of school status. Also, compared to similar models that did not include school status, the effects of school-average achievement are more negative when school status is controlled. Thus, for

example, Models 30 and 31 (Table 6) differ from Models 7 and 8 (Table 2) only in the inclusion of school status. Although the effects of school-average achievement are negative for all four models, the effects are more negative (-.14 and -.12 in Table 6) when school status is controlled than when it is not (-.09 and -.08 in Table 2).

Finally, in Models 32-35 (Table 6) perceived school status is added to models of T3 academic achievement. For these models, school status has very little effect on T3 academic achievement and all other effects in these models are similar to those in corresponding Models (Table 4) without school status. In particular, the positive effects of prior academic self-concept on subsequent achievement are not reduced by controlling school status. School status does not seem to have much effect – positive or negative – on T3 achievement beyond what can be explained by school-average achievement and prior achievement.

In summary, the juxtaposition of the positive reflected glory assimilation effects of school status and the negative contrast effects of school-average achievement supports a priori predictions. Furthermore, also consistent with a priori predictions, the inclusion of school status into models of academic self-concept resulted in the negative effects of school-average achievement becoming more negative. These suppression effects are consistent with theoretical predictions that the BFLPE is a net effect of the positive assimilation and negative contrast effects. Hence, when the positive assimilation effects are controlled by the inclusion of school status, the negative effect of school-average achievement becomes a more pure measure of the negative contrast effects and school-average achievement effects become more negative.

Discussion

Hong Kong is an ideal setting for testing the generalizability of the BFLPE and extending this research to more fully evaluate the juxtaposition between negative contrast and positive assimilation effects. The contextual differences are larger – because it is one of the most highly achievement segregated high school systems in the world – and so the contrast effects should be

more negative than in most Western settings. On the other hand, due to collectivist values in this Chinese setting and the value placed on attending a prestigious high school the typical social comparison processes underlying the negative BFLPE should be weaker, whereas the reflected glory processes may be stronger. Apparently reflecting these counter-balancing predictions, the size of the negative contrast effects in this study appear roughly comparable to those found in nationally representative US samples (e.g., Marsh, 1987; 1991).

Based on theory and limited research we hypothesized that the typical negative BFLPE is the net effect of counterbalancing negative contrast effects and positive reflected glory assimilation effects. Although reasonable, previous empirical support for this argument has been weak and mostly post hoc because previous BFLPE research has not collected independent measures of these two counterbalancing processes. As predicted, we found that the inclusion of perceived school status into the BFLPE model resulted in a positive effect of school status on academic self-concept (the reflected-glory assimilation effect) and an even more negative effect of school-average achievement on academic self-concept (the social comparison contrast effect). More specifically: (a) there was a strong negative BFLPE when school-average achievement (but not perceived school status) was included in the model; (b) the negative effect of school-average achievement became more negative when school status was included in the model whereas the effect of school status was positive; and (c) even in models of self-concept change there was evidence of new, additional social comparison contrast effects on T3 self-concept beyond the substantial negative effects on T2 self-concept and these additional negative effects also became more negative with the inclusion of perceived school status. The results imply that attending a school where school-average achievement is high -- particularly in Hong Kong -- simultaneously results in a more demanding basis of comparison for students within the school to compare their own accomplishments (the basis of the negative social comparison effect) and a source of pride for students within the school (the basis of the positive reflected glory effects). By including a separate measure of perceived school status, we partialled

out some of the reflected glory effects associated with school-average achievement so that it became a better (less confounded) basis for inferring social comparison contrast effects leading to a more negative BFLPE. These results also imply that previous research may have underestimated the size of the negative contrast effects . However, because reflected glory effects were predicted to be particularly important in Hong Kong, further research is needed to determine the generality of counter-balancing assimilation and contrast effects.

Other Features

Several other features of this study warrant further consideration and may lead to further research.

1. The results clearly support the growing body of research (e.g., Byrne, 1996; Marsh & Craven, 1997) showing reciprocal effects of academic self-concept and achievement; higher levels of prior achievement lead to better subsequent academic self-concepts and better academic self-concepts lead to higher levels of subsequent achievement (see Table 2). The multi-level models provide a new perspective, indicating that these effects do not vary much from school to school and do not depend very much on the school-average achievement levels, and supports the generalizability of previous research in a different setting using different analytic tools.

2. It is also relevant to emphasize that school-average achievement effects represent some complicated combination of the social comparison processes emphasized here, the quality of the education (e.g., resources, curriculum, expertise of the teachers, etc.) and, perhaps, family background factors. Furthermore, these effects are likely to be confounded (see Gamoran, Nystrand, Berends, & LePore, 1995; also see Tsang, 1998). However, because features other than the achievement grouping per se are likely to have a positive effect on subsequent outcomes, the typical BFLPE study is likely to be biased – at least in relation to evaluating a grouping effect – in favor of showing the positive effects of schools with high school-average achievements. Because of the direction of this potential bias, interpretations of the negative effects of school-average achievement on academic self-concept seem particularly robust; the effects are negative despite the

probable positive bias. The interpretations of the small effects on subsequent achievement, however, seem more problematic. When the effects are negative (e.g., Marsh, 1991) despite the probable positive bias, it seems reasonable to attribute the results to the negative effects of school-average achievement. When the effects are nonsignificant or even positive, however, it may be that negative grouping effects of school-average achievement are offset by the positive effects of variables related to school-average achievement. The results of school status provide one example of this sort of confounding for effects of school-average achievement on academic self-concept.

3. Few previous BFLPE studies have used longitudinal multilevel models that are appropriate for evaluating student level and school-level effects simultaneously. Because traditional analyses are likely be seriously biased and invalid when individuals belong to groups, educational research has increasingly used multilevel modeling to evaluate school effects (e.g., Bryk & Raudenbush, 1992). This problem, however, has equally serious implications for most applied social psychology and personality studies in which participants come from groups that are not formed randomly or even in experiments with random assignment where participants within each group interact. Indeed, it can be argued that most social psychological and personality research could benefit by taking a multilevel perspective, recognizing that social phenomena mostly occur in groups that are not formed randomly, and that this concern may even invalidate most of the statistical analyses conducted when groups are not formed through random assignment.

Implications for Further BFLPE and Social Comparison Theory Research

In relation to previous BFLPE research, the inclusion of perceived school status is a unique feature of our investigation. In addition to the face validity of the items, there is empirical support for the construct validity of the perceived status responses; these responses were highly related to school-average achievement – hypothesized as a primary determinant of perceived school status – and contributed positively to the prediction of academic self-concept. Of particular importance, consistent with theoretical predictions, controlling the positive school status component in school-

average achievement resulted in a more negative effect of school-average achievement on academic self-concept. For these reasons, perceived school status seems a particularly important construct to incorporate into future BFLPE studies .

Diener and Fujita (1997, p. 350), relating BFLPE research to the broader social comparison literature, emphasized that Marsh's BFLPE provided one of the strongest examples – maybe even one of the few defensible examples – where social comparison theory predictions have been validated in an imposed social comparison paradigm. Noting that the frame of reference, based on classmates within the same school, is more clearly defined than in most other research settings in their review, they also suggested – surprisingly from our perspective – that self-concept ratings are less influenced by social comparison than subjective well-being, quality of life, and global satisfaction ratings used in most other research that they reviewed. Although we agree generally with their observations, we disagree with this final interpretation. More specifically, because academic self-concept is more strongly anchored to an external, objective standard (academic achievement) we argue that well-defined academic self-concept responses are not so easily self-manipulated by impression management, flexible downward and upward comparisons, discounting, defensive pessimism, self-handicapping and other cognitive strategies designed to protect self-worth so that social comparisons based on the immediate environment are more influential than for more easily self-manipulated measures of subjective well-being. Indeed, except for opting out altogether, it is difficult for students to avoid the relevance of achievement as a reference point within a school setting or the social comparisons provided by the academic accomplishments of their classmates. Importantly, it is also critical to distinguish between academic self-concept (emphasized in BFLPE research) and self-esteem (emphasized in much social psychology research) that is more ephemeral, more easily self-manipulated, and more easily altered with self-protection strategies than academic self-concept responses (Marsh, 1993; also see related discussion of the Chameleon effect in self-esteem by Marsh & Yeung, 1999).

In summary, as emphasized by Diener and Fujita (1997) and consistent with the growing body of BFLPE research, the results of the present investigation demonstrate that imposed social comparisons do matter. Even in a collectivist cultural setting hypothesized to minimize negative social comparison contrast effects, there is strong support for a negative BFLPE. More clearly than any previous BFLPE research and, perhaps, any other studies using the imposed social comparison paradigm, our results unmistakably differentiated between negative social comparison contrast effects and positive reflected glory assimilation effects that comprise the BFLPE. Whereas this finding is certainly consistent with theoretical predictions and is implicit in previous explanations of the BFLPE, this previous research has not operationalized the reflected glory effect. A major focus of BFLPE research has been on the substantively important and surprising implications of this research, undermining the assumed advantages of attending academically selective schools. Although obviously supportive of these well-established concerns, the present investigation provides stronger links between BFLPE and broader areas of social comparison theory (e.g., Buunk & Ybema, 1997; Diener & Fujita, 1997; Lazarus & Folkman, 1984; McFarland & Buehler, 1995; Taylor & Lobel, 1989; Tesser, 1988; Wills, 1981).

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Appendix Describing Multilevel Models

Models considered here are two-level models (students = level 1, schools = level 2). To illustrate, consider a simple level-1 model relating the dependent variable (Y = T3ASC, T3 academic self-concept) to pretest achievement (T0Ach) with an intercept (B0), a slope (B1), and a residual variance (R).

```
(1) T3ASC = B0 + B1*(T0Ach) + R      [Level-1 model]
```

Unlike the typical regression model, the slope and intercept are allowed to vary from school to school rather than assuming that they are the same across all schools. In the (school) level-2 model there are separate regression equations for the intercept and the slope terms that can also include school-level variables such as school-average pretest achievement (S_Ach). Thus, the intercept for each school (B0 from equation 1 that is modeled in equation 2) is a function of a grand mean of intercepts across all schools (G00), a slope representing the effect of S_Ach (G01), and a residual term (U0) that is specific to the particular school.

```
(2) B0 = G00 + G01*(S_Ach) + U0      [Level-2 model]
```

Similarly, the slope for each school (B1 from equation 1 that is modeled in equation 3) is a function of a grand mean of slopes across all schools (G10), an effect of S_Ach (G11) on the slope (the extent to which the effect of T0Ach on T3ASC varies as a function of S_Ach, G11, is an interaction term), and a residual term (U1) for each school.

```
(3) B1 = G10 + G11*(S_Ach) + U1      [Level-2 model]
```

This approach is quite flexible in that other (student) level-1 predictors can be added to equation 1 such as achievement from T1, T2, or T3, T2 academic self-concept, and perceived school status. For each additional level 1 variable it is possible to model the effect (e.g., additional slope terms B2, B3, etc) as a function of a grand mean slope across all schools (G20, G30, etc.), the extent to which this effect varies with school-average achievement (G21, G31, etc.) and a residual term for each school (U2, U3, etc.). Although school-average achievement is the only

(school) level-2 explanatory variable considered in this study, it is possible to include other school-level variables. In multilevel modeling, there are fixed effects (e.g., G00, G01, G10, G11) and random effects (R, U0, U1). For each fixed effect there is a parameter estimate and a standard error that is used to assess its statistical significance. For each residual effect there is a residual variance term indicating how much residual variance there is in the prediction of the student level variable (variance of R) or for the level 2 residuals (e.g., U0, U1, etc.).

Particularly in multilevel models, it is useful to transform variables so as to facilitate interpretations. Following Marsh and Rowe (1996; also see Aiken & West, 1991; Bryk & Raudenbush, 1992) we began by standardizing (z-scoring) all non-repeated variables (i.e., all but T2 and T3 academic self-concepts) to have M = 0, SD = 1 across the entire sample. T2 and T3 self-concepts were standardized in terms of the mean and standard deviation of T2 self-concept so that change in self-concept over time was not lost through standardization. School-average achievement (S_Ach) was the school-average individual (z-score) standardized pretest achievement scores (T0Ach) and was not re-standardized. In this respect, results summarized in Tables 2-6 can be thought of as standardized regression weights that are interpreted in much the same way as regression coefficients from traditional multiple regressions analyses (except, of course, that the analyses take into account the multilevel structure of the data).

Table 1

Academic Self-concept (Actual and Predicted) As A Function of School-average and Individual Levels of Achievment

Individual Achievement		School-average Achievement			
		Low	Med	High	Total
Low	Actual	-.24	-.38	-.45	-.29
	Pred	-1.14	-.96	-.87	-1.08
	N	1742	709	56	2507
Med	Actual	.12	-.06	-.17	-.03
	Pred	-.20	-.09	.10	-.08
	N	704	1384	514	2602
High	Actual	.53	.38	.26	.30
	Pred	.79	.80	1.22	1.12
	N	125	521	1972	2618
Total	Actual	-.11	-.06	.16	.00
	Pred	-.79	-.15	.95	.00
	N	2571	2614	2542	7727

Note: For purposes of illustration, pretest individual and school-average achievement were divided into three (low, med, high) groups, each consisting of approximately 1/3 of the cases. For each of the 3 x 3 = 9 cells, the mean actual and predicted academic self-concept (averaged over T2 and T3) are presented. Predicted self-concepts are based on self-concepts predicted from mean pretest individual achievement scores. Excluded are 270 cases with missing values on at least one of the variables.

Table 2

Models of Academic Self-concept (T2 T3 and Change) As A Function of Individual and School-Average Achievement

	T2 Academic Self Concept						T3 Academic Self-concept (not change)						Change in T3 Academic Self-concept					
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8		Model 9	
Fixed Effects	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
S_Ach G01	-.24**	.04	-.23**	.04	-.22**	.04	-.23**	.04	-.21**	.04	-.20**	039	-.09**	.03	-.08*	.03	-.07*	.03
T0Ach G10	.13**	.02	.22**	.02	.32**	.02	.10**	.02	.14**	.02	.21**	018	.06**	.02	.09**	.02	.11**	.02
T0Ach X S_Ach G11	.01	.02	.02	.02	.05*	.02	-.05*	.02	-.04*	.02	-.02	021	-.06**	.02	-.06**	.02	-.05*	.02
T1Ach G20	.04*	.02	.18**	.02		.02	.01	.02	.06**	.02	.17**	018	.00	.02	.04**	.02	.08**	.01
T1Ach x S_Ach G21	.01	.02	.04	.02		.02	.03	.03	.03	.03	.07**	023	.02	.02	.02	.02	.04*	.02
T2Ach G30	.29**	.02					.12	.02	.22**	.02			.03	.02	.09**	.02		
T2Ach x S_Ach G31	.06**	.02					.07**	.02	.08**	.02			.02	.02	.03	.02		
T3Ach G40							.25**	.02					.17**	.02				
T3Ach x S_Ach G41							.05**	.03					.04	.03				
T2ASC G50													.38**	.01	.39**	.01	.40**	.02
T3Ach x S_Ach G51													.10**	.02	.10**	.02	.11**	.02
level-1 Residual	.77		.80		.82		.67		.70		.72		.54		.56		.56	

Note. T0, T1, T2, and T3 are pretest, and years 1, 2 and 3 of the four-year study. Ach = achievement. S_Ach = pretest school-average achievement, ASC = academic self-concept. Following standard notation (see appendix): fixed effects are labeled with a G followed by two numbers; the first number refers to the independent variable and the second number is either a 0 (an effect on an intercept term) or 1 (an effect on a slope term). Random effects are excluded to save space, but the residual variance at the student level (level 1) is presented.

Table 3

Models of Achievement (T1 T2 T3) As A Function of Prior Achievement and School-Average Achievement

	T1 Achievement		T2 Achievement				T3 Achievement					
	Model 10		Model 11		Model 12		Model 13		Model 14		Model 15	
Fixed Effects	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
S_Ach G01	.06	.08	.01	.04	.04	.07	.10	.05	.10	.06	.10	.08
T0Ach G10	.61**	.02	.31**	.02	.59**	.02	.20**	.02	.30**	.02	.53 **	.02
T0Ach x S_Ach G11	-.08**	.02	.00	.02	-.03	.02	-.02	.02	-.01	.03	-.05	.03
T0Ach, G20			.45**	.02			.18**	.01	.35**	.02		
T1Ach x S_Ach G21			.01	.02			-.00	.02	-.00	.02		
T2Ach G30							.36**	.01				
T2Ach x S_Ach G31							.01	.02				
level-1 Residual	.38		.36		.66		.31		.36		.41	

Note. T0, T1, T2, and T3 are pretest, and years 1, 2 and 3 of the four-year study. Ach = achievement. S_Ach = pretest school-average achievement, ASC = academic self-concept. Following standard notation (see appendix): fixed effects are labeled with a G followed by two numbers; the first number refers to the independent variable and the second number is either a 0 (an effect on an intercept term) or 1 (an effect on a slope term). Random effects are variance components at the school level or residual variance of the individual student level, .

Table 4

Models of Achievement (T2 T3) as a Function of Prior Achievement School-Average Achievement and Academic Self-concept

	T2 Achievement		T3 Achievement									
	Model 16		Model 17		Model 18		Model 19		Model 20		Model 21	
Fixed Effects	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
S_Ach G01	.04	.05	.08	.07	.12*	.05	.12*	.05	.13*	.06	.14	.08
T0Ach G10	.29**	.02	.54**	.02	.19**	.02	.19**	.02	.28**	.02	.48**	.02
T1Ach x S_Ach G11	-.01	.02	-.06*	.02	-.02	.02	-.02	.02	-.02	.03	-.06*	.03
T1Ach G20	.43**	.02			.17**	.01	.17**	.01	.33**	.02		
T1Ach x S_Ach G21	-.00	.02			-.01	.02	-.00	.02	-.01	.02		
T2Ach G30					.34**	.01	.34**	.01				
T2Ach x S_Ach G31					-.00	.02	.00	.02				
T2ASC G40	.10**	.01	.15**	.01	.00	.01	.04**	.01	.09**	.01	.12**	.01
T2ASC x S_Ach G41	.04	.01	.05**	.01	-.01	.01	.01	.01	.02*	.01	.03**	.01
T3ASC G50					.08**	.01						
T3ASC x S_Ach G51					.03	.01						
level-1 Residual	.35		.42		.31		.31		.35		.40	

Note. T0, T1, T2, and T3 are pretest, and years 1, 2 and 3 of the four-year study. Ach = achievement. S_Ach = pretest school-average achievement, ASC = academic self-concept. Following standard notation (see appendix): fixed effects are labeled with a G followed by two numbers; the first number refers to the independent variable and the second number is either a 0 (an effect on an intercept term) or 1 (an effect on a slope term). Random effects are excluded to save space, but the residual variance at the student level (level 1) is presented.

Table 5

Models of Perceived School Status as a Function of: Achievement School-Average Ability and Academic Self-concept

	Perceived School Status											
	Model 22		Model 23		Model 24		Model 25		Model 25		Model 27	
Fixed Effects	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Intercept G00	-.08	.05	-.08	.05	-.09	.05	-.10*	.05	-.09	.04	-.10*	.05
S_Ach G01	.60**	.06	.60**	.06	.55**	.06	.55**	.06	.60**	.06	.56**	.06
T0Ach G10	-.14**	.02	-.15**	.02	-.12**	.02	-.12**	.02	-.22**	.02	-.17**	.02
T0Ach x S_Ach G11	.06**	.02	.08**	.02	.07**	.02	.09**	.02	.12**	.02	.13**	.02
T1Ach G20	-.09**	.02	-.11**	.02	-.08**	.02	-.08**	.02				
T1Ach x S_Ach G21	.02	.02	.05*	.02	.02	.02	.06**	.02				
T2Ach G30	-.05**	.02			-.00	.02						
T2Ach x S_Ach G31	.06*	.02			.07**	.02						
T2ASC G40	.16**	.01	.15**	.01					.14**	.01		
T2ASC x S_Ach G41	.01	.01	.01	.01					.02	.01		
level-1 Residual	.66		.66		.68		.68		.67		.69	

Note. T0, T1, T2, and T3 are pretest, and years 1, 2 and 3 of the four-year study. Ach = achievement. S_Ach = pretest school-average achievement, ASC = academic self-concept. Following standard notation (see appendix): fixed effects are labeled with a G followed by two numbers; the first number refers to the independent variable and the second number is either a 0 (an effect on an intercept term) or 1 (an effect on a slope term).Random effects are excluded to save space, but the residual variance at the student level (level 1) is presented.

Table 6

Models of T3 Academic Self-concept and T3 Achievement as a Function of: Prior Achievement School-Average Ability Prior Academic Self-concept and Perceived School Status

	T3 Academic Self-concept				T3 Self-concept Change				T3 Achievement							
	Model 28		Model 29		Model 30		Model 31		Model 32		Model 33		Model 34		Model 35	
Fixed Effects	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
S_Ach G01	-.33**	.05	-.31**	.04	-.14**	.03	-.12**	.03	.13*	.05	.12*	.05	.13*	.06	.08	.06
T0Ach G10	.12**	.02	.16**	.02	.07**	.02	.10**	.02	.18**	.02	.19**	.02	.28**	.02	.30**	.02
T1Ach x S_Ach G11	-.06*	.02	-.06*	.02	-.07**	.02	-.06**	.02	-.02	.02	-.02	.02	-.02	.03	-.01	.03
T1Ach G20	.02	.02	.08**	.02	.01	.02	.05**	.02	.17**	.01	.17**	.01	.33**	.02	.35**	.02
T1Ach x S_Ach G21	.03	.03	.03	.02	.02	.02	.02	.02	-.01	.02	-.00	.02	-.01	.02	.00	.02
T2Ach G30	.12**	.02	.22**	.02	.03	.02	.10**	.02	.33**	.01	.34**	.01				
T2Ach x S_Ach G31	.06*	.02	.07**	.02	.02	.02	.03	.02	.00	.02	.00	.02				
T3Ach G40	.25**	.02			.18**	.02										
T3Ach x S_Ach G41	.04	.03			.03	.03										
T2ASC G50					.36**	.01	.38**	.02	.00	.01	.05**	.01	.09**	.01		
T2ASC x S_Ach G51					.10**	.02	.10**	.02	-.01	.01	.01	.01	.02	.01		
T3ASC G60									.08**	.01						
T3ASC x S_Ach G61									.03	.01						
Status G70	.17**	.01	.17**	.01	.09**	.01	.09**	.01	-.02*	.01	-.02	.01	-.02*	.01	-.00	.01
Status x S_Ach G71	.01	.01	.01	.01	-.02	.01	-.02	.01	.02	.01	.02	.01	.03*	.01	.04**	.01
level-1 Residual	.65		.68		.54		.55		.30		.31		.35		.36	

Note. T0, T1, T2, and T3 are pretest, and years 1, 2 and 3 of the four-year study. Ach = achievement. S_Ach = pretest school-average achievement, ASC = academic self-concept, Status = perceived school status. Following standard notation (see appendix): fixed effects are labeled with a G followed by two numbers; the first number refers to the independent variable and the second number is either a 0 (an effect on an intercept term) or 1 (an effect on a slope term). Random effects are excluded to save space, but the residual variance at the student level (level 1) is presented.

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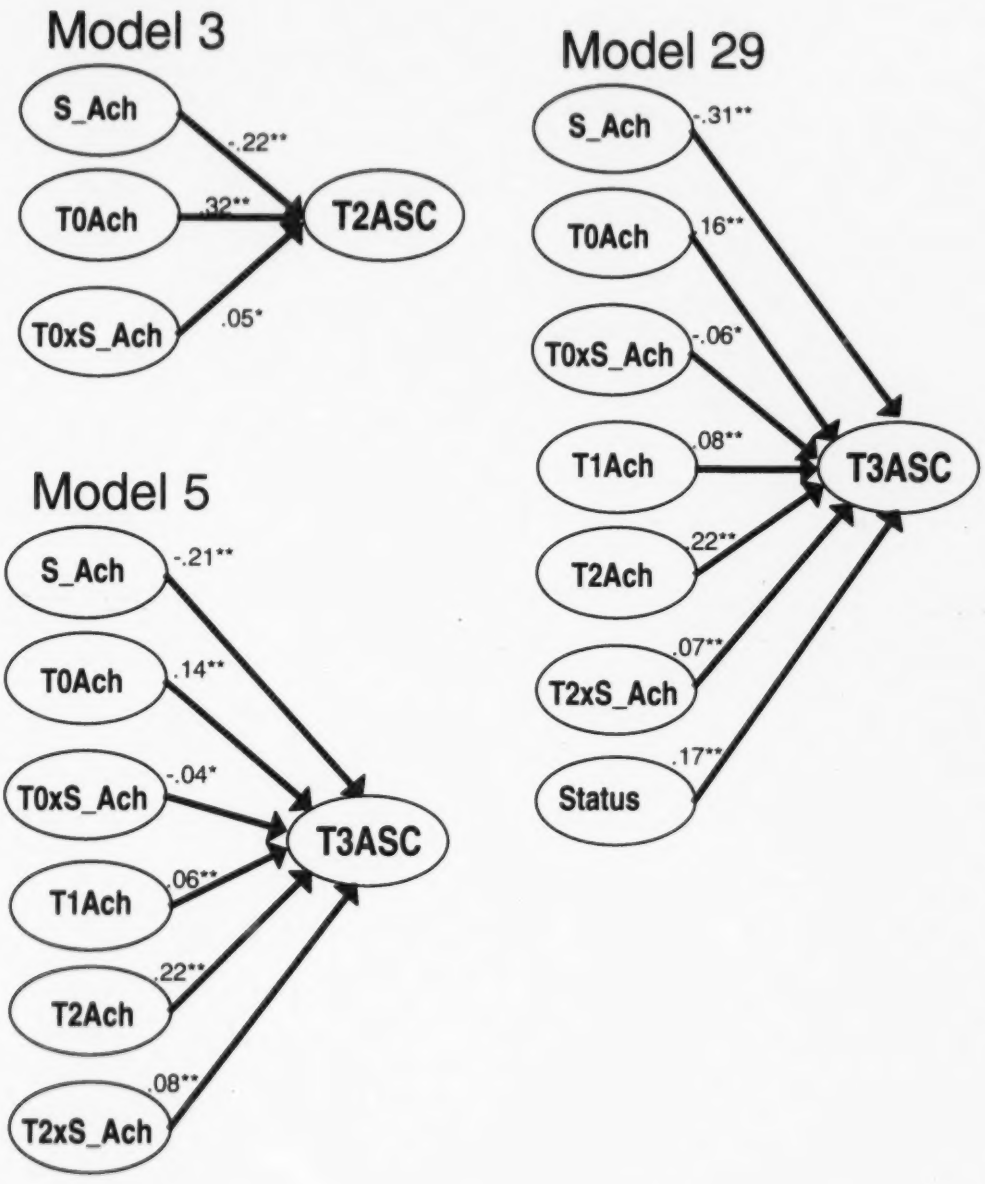

Figure 1. Selected Models of the Big-Fish-Little-Pond Effect. Only Significant effects are shown (For more detail see Table 2 (Models 3 and 5) and Table 6 (Model 29)). T0, T1, T2, and T3 are pretest, and years 1, 2 and 3 of the four-year study. Ach = achievement. S_Ach = pretest school-average achievement, ASC = academic self-concept, Status = perceived school status; T0xS_Ach, T1xS_Ach, and T2xS_Ach are interaction effects that test the extent to which the effects of T0, T1, and T2 Achievement vary with school-average achievement.